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WCCF 77



\$220;

interface \$160
(kit) incl.
Rom

DIGITAL DATA RECORDER
MODEL 3M3

NEW DESIGN!

Featuring the radically new "UNIBOARD" method of construction for data cartridge drives. The major computer manufacturers are changing from cassettes to cartridges at a rapid pace because of freedom from binding and greater data reliability. Now, these professional type units are priced within the range of all data users. Being made primarily as OEM data storage units for the world's major manufacturers, these units, together with controller board and software ROM, are being made available to the individual user as well. Data cartridge systems are so nearly error free the error rate is not measureable with certified tape.

MODEL 3M3 SPECIFICATIONS: Uses the 3M Data Cartridge, model DC 300. This cartridge contains 300 feet of .250 tape in a sealed container. Records and plays at 9600 baud or less Phase Encoded. Nominal is speed 9" per second. Using four tracks, you can store nearly 2 megabytes of data on a cartridge. Cartridge measures 4" by 6". Turns counter indicates tape position. Inter-record gap light gives more accurate position. 2SIO (R) is not required for use but is highly recommended for 8080 and Z80 systems. Can be used with any serial I/O port with 2 parallel bits for control.

FULL SOFTWARE CONTROL of record, play, fast forward and rewind. LED indicates inter-record gaps. EOT and BOT are sensed and automatically shut down recorder. Can also be manually operated using the switches on top which parallel the software control signals when not under software control. Signal feedback makes it possible to software search for inter-record gaps at high speed. 117V - 60 Hz - 5 watts. (220 V - 50 Hz Export) Twelve pin edge card connector provided with each unit. Phase encoding board, motor control board and read/write electronics are included. Phase Encoding requires a clock signal to and from the computer or terminal.

SOFTWARE: comes complete with 8080, Z80 and 8085 software program listings for the programs on the 2SIO (R) ROM below. 6800 software is being written, but not yet completed. These programs give FULL SOFTWARE CONTROL. Additional software is forwarded periodically in our service notes.

CARTRIDGE AVAILABILITY: Cartridges are made by 3M, ITC, Wabash and others. They are available at all computer supply houses and most major computer service centers. We can also supply them at normal current list prices.

"COMPUTER AID" and "UNIBOARD" are trademarks of the National Multiplex Corporation.
The 3M Data Cartridges are covered by 3M Patents and Marks. "UNIBOARD" Patents Pending
cover the 3M3 Recorders.

OVERSEAS: Export Version 220 volt 50 hz. Write factory or: Megatron-Datameg, 8011 Putzbrunn, Munchen, Germany; Nippon Automation 5-16-7 Shiba, Minato-Ku, Tokyo, Japan; Hobbydata, FACK 20012, Malmo, Sweden; G. Ashbee, 172 Ifield Road, London SW 10-9ag; Trintronics, Ltd., 186 Queen Street, W. Toronto, Ontario, Canada.

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PRELIMINARY SOFTWARE CONTROL INSTRUCTIONS

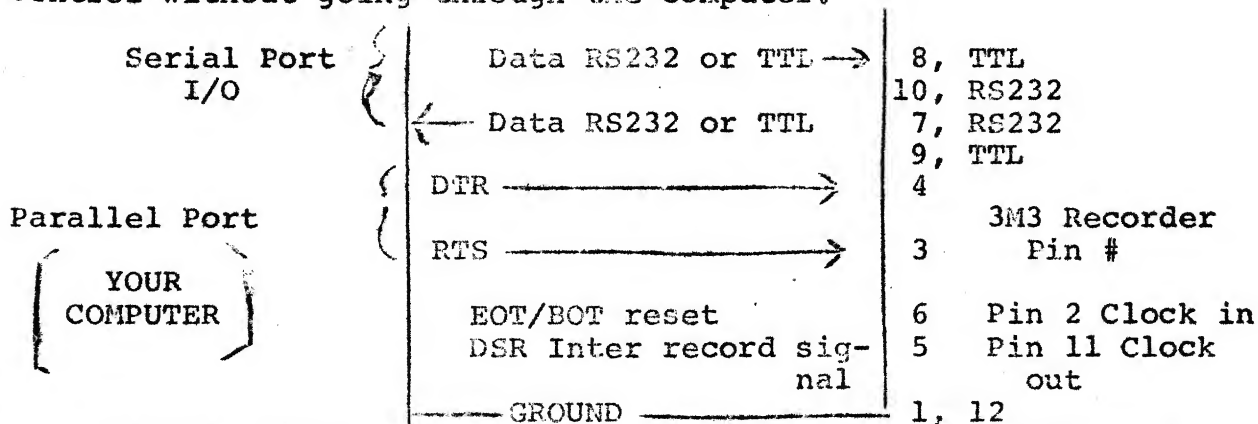
Data Cartridge Recorders 3M1 and 3M3 utilize 2 bits of a controlling parallel output latch for motor and recorder control. The control is not direct, but depends upon a sequence of output signals from the latches. The signals shown here are assumed to come from an 8251 (Intel), but can be derived from the other I/O boards as well. (Any parallel latch or IA.)

For normal forward Record or Play			For fast forward & rewind		
	<u>DTR</u>	<u>RTS</u>		<u>DTR</u>	<u>RTS</u>
Start from	1	1	Start from	1	1
Record	1	0	Set Fast	0	0
Play	0	1	Fast Forward	0	1
Stop	1	1	Rewind	1	0
			Stop	1	1

When used with the National Multiplex 2SIO(R) board (x2 ROM set,) the sequences are supplied by the ROM. An "F" starts the fast forward, "R" starts Rewind. Hitting any key during fast forward or rewind stops the recorder. Normal play and record are initiated by the Control S, E, S, K, and H commands. BOT and EOT also stop the recorder and reset the latches, both in the recorder and in the computer.

Feedback from the 3M3 consists of EOT/BOT and inter-record gap signals as well as the data. Inter-record gap is detected from the data. A "1" indicates data flowing, a "0" indicates data has stopped. This is used in software for gap counts. In the 2SIO(R) board this signal is returned to the 8251 via the DSR lead and sensed as status bit 7.

Manually operated switches at the rear of the unit permit local control without going through the computer.



Signal input and output may be TTL or RS232. There is a jumper located on the printed circuit board to select the desired signal mode.

The 3M3 has a phase encoder board built in that it requires a 1 to 1 clock. On playback, it returns a 1/1 clock to the computer. 16 to 1 clock is available optionally on playback.

DIGITAL DATA NEWS

NEW DISC SPEED RECORDER RELEASED

FLASH! NATIONAL MULTIPLEX announces 3M3A model. Discontinues 3M3.

To meet the demand for 3M cartridge recorders and produce a better, more reliable unit in greater volume, National Multiplex has redesigned the 3M3 to remove the bugs which have made it virtually impossible to manufacture. In so doing, performance has been raised by a factor of 10 to 1.

Sixteen to one clocks and Phase Encoding are out. So are the manual switches and turns counter. A new, more powerful motor has been added and the power supply reserve increased.

While this new model will not serve everyone, it will make 98% of the users a lot happier. It will also make the staff at National Multiplex a lot happier because it can be manufactured in a reasonable time and the months' long backlog can be reduced in a very short time to off-the-shelf.

BAUD RATE IMPROVED

Indications are at this time that the 3M3A will run at 40 - 50 kilobaud. Further testing on error rate will be necessary to certify this, but they are running at 50 plus kilobaud at the factory. This means the 3M3A will still be able to record nearly 2 megabytes of data on a cartridge and have a worst case access in search of about 100 seconds.

Phase encoding costs the user 2/1 in data density plus a baud rate freeze. Since the 3M3A is NRZ without a phase encoder board, and uses a separate clock track, the density is doubled. This method of recording has greater distortion tolerance, hence the baud rate can go higher still. It is now limited by the ability of the computer to load it. Data reading is done at high speed (search speed) now that the recorder is freed of the P.E. restrictions.

TWO-TRACK PAIRS USED

The 3M3A uses track pairs (upper and lower). The outside track is used for clocking and the inside tracks for data. Using the NRZ mode, this method obtains the best possible data density on tape. The problems associated with phase encoding are eliminated. Phase encoding is very critical to adjust and has only limited speed tolerance. The 3M3A has very few user adjustments. In fact, we recommend the unsophisticated user make none whatever.

NOT for ALL I/O BOARDS

If you have a UART type I/O board and want to use a 3M3A Recorder under software control, forget it. IT WON'T WORK. The UART requires a 16/1 Clock. The clock from the 3M3A is 1/1, which means you must use an ACIA or USART I/O. S100 boards with UART's are the 3 P + S and the earlier MITS 88SIO series. Acceptable boards include the IMTAI 2SIO, MITS 2SIO and National Multiplex 2SIO(R). UARTs are slow speed devices which cannot accommodate these high baud rates.

Proper operation of the 3M3A requires approximately 800 bytes of software in RAM ~~xxx~~ or ROM. These programs are in ROM supplied with the National Multiplex 2SIO(R). Software listings are available for other users of 8080 systems. 6800 software should be available soon.

PAIRING IMPROVED

The 3M3A has additional control lines to permit software control of pairs. With the 3M3 it was necessary to manually select which of a pair was to be used or to use a diode switching scheme. Use of the "activate" line selects which cartridge unit will be operated when the units are paired. A new 2SIO(R) board (Rev.7) is being designed along with new ROM programs to control multiple 3M3 A's. It is expected that this board will use reprogrammable 2708's.

HOW DOES IT WORK?

A four track head is used. Two of the tracks are used for clock signals and two for data. Recording on both tracks is NRZ (Tape Saturation).

Two identical record/play amplifiers are used - one for each track. Recording is done at 19.2 Kilo baud, with the tape operating at constant speed. Playback is done at the highest speed permitted by the software loading loop. (This is around 50 Kilobaud). New Bifet amplifiers are used, giving nearly distortion free response.

You must provide the 19.2 Kilo baud clock and have an I/O board which can accept a variable speed 1/1 clock on receive.

Motor control, record, play, fast forward, rewind etc. are under software or Keyboard control. For this you require a parallel port with at least three bits that latch. These signals are provided by the 2SIO(R) board from National Multiplex. Revision 6 and earlier boards will control one 3M3A. Revision 7 boards will control two.

16/1 Clock System

UART users should use the CC-8 model which is ASYNCHRONOUS and suitable for applications where 1/1 clocking cannot be used. Asynchronous use does not require external clocking. You should not plan to use a 3M3A at baud rates below 2400. It will work, or can be made to work, but it is an awful overkill. Would you run a disc at 110 baud? Use the CC-8 for low baud rate recording. You can get four times as much low baud rate data on a cassette of equal (300') length.